भारतीय मानक
Indian Standard

IS 761 : 2017

(Reaffirmed 2022)

अदरक का तेल — विशिष्टि

(दूसरा पुनरीक्षण)

Oil of Ginger — Specification

(Second Revision)

ICS 71.100.60

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March 2017 **Price Group 3**

Fragrance and Flavour Ingredients Sectional Committee, PCD 18

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Fragrance and Flavour Ingredients Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard was first published in 1955 and revised in 1988 based on the observation that the physico-chemical characteristics of the oil produced in India generally agree with those of the oil produced elsewhere in the world.

In this revision, the gas chromatographic method given under Annex A is for guidance and has been modified to include profiles through polar and non-polar columns. It is expected that the corresponding chromatograms would facilitate better purity profile and identification. The Committee also noted that as a practice, the fragrance and flavour ingredients are traded at International level quoting the relative density and refractive index at 20°C rather than at 27°C as prescribed in the Indian Standards. Therefore, the Committee felt that the standard should be revised again to incorporate values for these important characteristics at 27°C (to cater to domestic needs) and at 20°C (to facilitate International trade).

India is the largest producer of ginger (*Zingiber officianale*, Roscoe) and is also one of the largest exporters of ginger, ginger oil and ginger oleoresin. Ginger is grown in Kerala, Meghalya, Orissa, Himachal Pradesh, West Bengal, Andhra Pradesh and other states of India. It is used as a flavouring agent in aerated waters, confectionary and as a spice for culinary purposes.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard
OIL OF GINGER — SPECIFICATION
(Second Revision)

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for the oil of ginger.

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
326	Methods of sampling and test for natural and synthetic perfumery materials
(Part 1) : 1984	Sampling (*second revision*)
(Part 2) : 1980	Preliminary examination of perfumery materials and samples (*second revision*)
(Part 3) : 2006/ ISO 279 : 1998	Determination of relative density (*third revision*)
(Part 4) : 2005/ ISO 592 : 1998	Determination of optical rotation (*third revision*)
(Part 5) : 2006/ ISO 280 : 1998	Determination of refractive index (*third revision*)
(Part 6) : 2005/ ISO 875 : 1999	Evaluation of miscibility in ethanol (*third revision*)
(Part 8) : 2005/ ISO 709 : 2001	Determination of ester value (*third revision*)
1070 : 1992	Reagent grade water — Specification (*third revision*)
2284 : 1988	Methods for olfactory assessment of natural and synthetic perfumery materials (*first revision*)
6597 : 2001	Glossary of terms relating to fragrance and flavour industry (*second revision*)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 6597 shall apply.

4 REQUIREMENTS

4.1 Description

4.1.1 *Source*

The oil of ginger shall be obtained by water or steam distillation of coarsely ground (partially dried after ground) rhizome of ginger (*Zingiber officianale*, Roscoe).

4.1.2 The material shall be a clear liquid, free from sediment, suspended matter, separated water and adulterants, when tested as prescribed in IS 326 (Part 2).

4.1.3 The oil shall be tested olfactorily and especially for by notes as prescribed in IS 2284.

4.2 Solubility

The material shall be soluble with not more than a slight turbidity in one volume of ethanol when tested as prescribed in IS 326 (Part 6).

4.3 The material shall also comply with the requirements given in Table 1.

5 PACKING AND MARKING

5.1 Packing

The material shall be packed as agreed to between the purchaser and the supplier.

5.2 Marking

The containers shall be marked with the following:

a) Name of the material;
b) Manufacturer's name or recognized trade-mark, if any;
c) Year of manufacture; and
d) Volume of the material in the package.

5.3 The containers shall be well protected from light and stored in a cool and dry place.

5.3.1 *BIS Certification Marking*

The containers may also be marked with the Standard Mark.

Table 1 Requirements for Oil of Ginger

(*Clause* 4.3)

Sl No. (1)	Characteristic (2)	Requirements (3)	Method of Test, Ref to (4)
i)	Odour	Sharp lemony top note with persistent dry spicy note	IS 2284
ii)	Colour and appearance	Light yellow to greenish yellow liquid	IS 326 (Part 2)
iii)	Relative density[1] :		
	a) at 20°C	0.870 – 0.882	IS 326 (Part 3)
	b) at 27°C	0.866 5 – 0.880 5	
iv)	Refractive index[1] :		
	a) at 20°C	1.486 0 – 1.496 0	IS 326 (Part 5)
	b) at 27°C	1.484 0 – 1.494 0	
vi)	Optical rotation	– 28° to – 48°	IS 326 (Part 4)
vii)	Saponification value[2], *Max*	20	IS 326 (Part 8)

[1] The correction factors for relative density and refractive index for each degree Celsius change in temperature are 0.000 64 and 0.000 38, respectively.

[2] The sample test portion is about 5g of the material and the refluxing time is 1 h [*see* **9.3.1** of IS 326 (Part 8)].

5.3.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

6 SAMPLING

6.1 Representative samples of the test material shall be drawn from the lots as prescribed in IS 326 (Part 1).

6.2 Number of Tests

6.2.1 Tests for the determination of distillation range shall be conducted on the individual samples.

6.2.2 Test for determination of the remaining characteristics shall be conducted on the composite sample.

6.3 Criteria for Conformity

6.3.1 For individual samples, criteria shall be determined in accordance with **3.7.1** of IS 326 (Part 1).

6.3.2 For composite sample, criteria shall be determined in accordance with **3.7.2** of IS 326 (Part 1).

7 QUALITY OF REAGENTS

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure Chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

ANNEX A

(*Foreword*)

GAS CHROMATOGRAPHIC ANALYSIS FOR OIL OF GINGER

A-0 GENERAL

The chromatographic conditions given here are for guidance only.

A-1 OUTLINE OF THE METHOD

A sample of the material is dissolved in suitable solvent (for example, cyclohexane and diethyl ether) and is injected into the gas chromatograph where it is carried by the carrier gas from one end of the column to the other. During its movement, the constituents of the sample undergo distribution at different rates and ultimately get separated from one another. The separated constituents emerge from the end of the column one after another and are detected by suitable means whose response is related to the amount of a specific component leaving the column.

A-2 APPARATUS

A-2.1 Any gas chromatograph capable of being operated under conditions suitable for resolving the individual constituents into distinct peaks may be used. The typical polar and non-polar chromatogram for oil of ginger using a capillary column with the following chromatographic conditions is shown in Figs. 1 and 2.

A-2.2 Gas Chromatographic Conditions for Polar Column

Column : Polar column[1]

Carrier gas : Nitrogen

Sample size : 0.2 µl

Injector temperature : 240°C

Initial temperature and program rate :

Oven Ramp	°C/ min	Next °C	Hold Time
Initial	—	60	2.00
Ramp I	2.50	120	0.00
Ramp II	0.10	130	0.00
Ramp III	8.00	220	20.00

Detector type : Flame ionization detector

Detector temperature : 240°C

Oven final temperature : 220°C

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[1] Carbowax/ 60m.

A-2.3 Gas Chromatographic Conditions for Non-Polar Column

Column : Non-polar column[1]

Carrier gas : Helium

Injector temperature : 280°C

Initial temperature : 70°C

Program rate : 2°C/min

Detector type : Flame ionization detector

Detector temperature : 280°C

Oven final temperature : 270°C

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[1] DB-5 MS/ 60m.

A-3 PROCEDURE

Set the gas chromatograph for the appropriate operating conditions and inject sample at injection port where it is vapourized and well mixed with the carrier gas. This is then led into the chromatographic column in the vapour form. The constituents of the sample are separated out by virtue of their differing interaction with the stationary phase. For this separation to be efficient, it is necessary that the column is maintained at particular temperature throughout the time required for the resolution of the constituents. As the sample enters the detector, it gives the signal corresponding to the amount of particular constituent leaving the column. The detector signal on transmission to an electronic integrator plots the chart. From the specific area under different peaks corresponding to specific constituent, the quantities of different constituents are determined.

A-4 CALCULATION

Peak areas are calculated either by the most commonly used triangular method or automated integration. When an electronic integrator is used, concentrations of the constituents on the basis of the peak areas on chromatogram are automatically calculated and presented as a printout. For specific constituents, internal standard method is employed for higher accuracy. The different peaks of polar and non-polar chromatogram are shown in Fig. 1 and Fig. 2 have been numbered and represent specific constituents as given in Table 2 and Table 3, respectively.

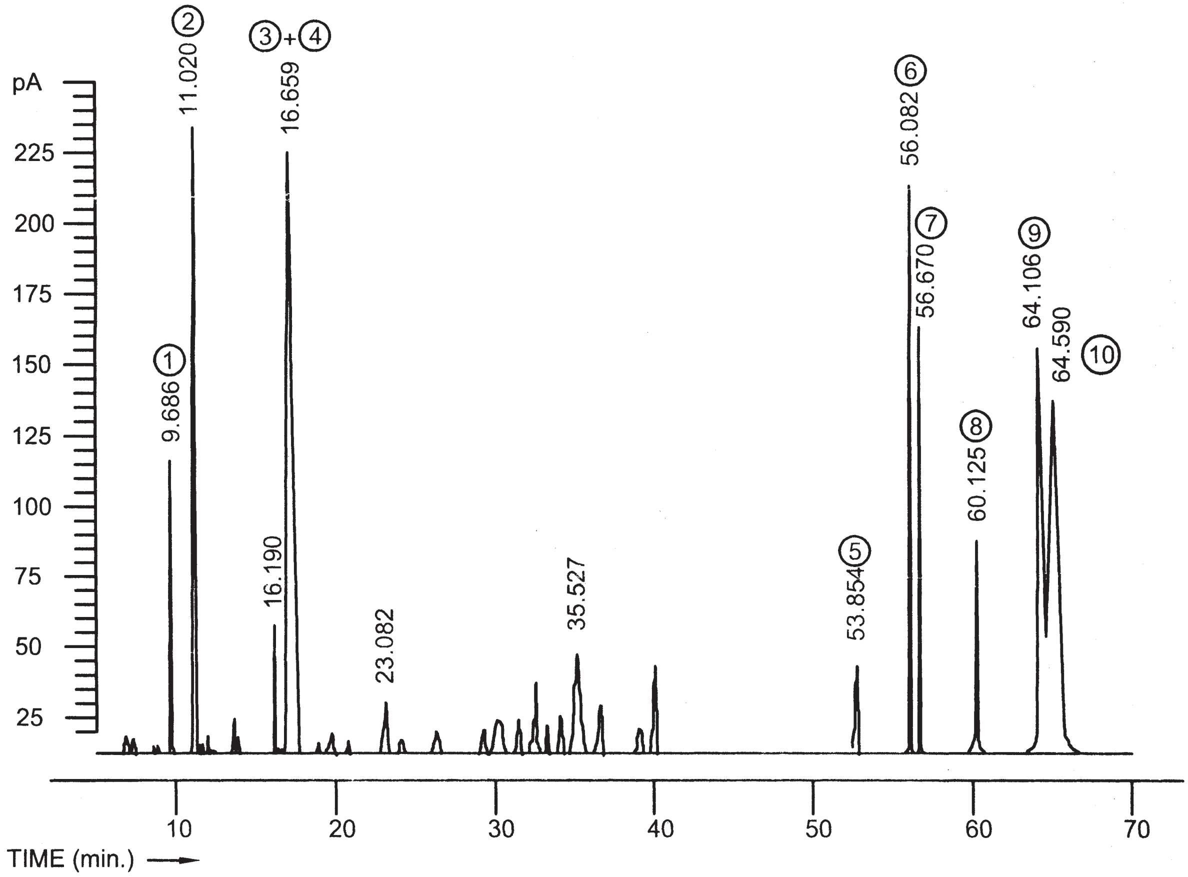

FIG. 1 OIL OF GINGER — GC PROFILE ON POLAR COLUMN

Table 2 Polar Chromatogram Peaks Identification

(*Fig*. 1 and *Clause* A-4)

Sl No. (1)	Peak No. (2)	Identification (3)
i)	1	Alpha pinene
ii)	2	Camphene
iii)	3 + 4	Phellandrene + 1,8-cineole
iv)	5	Germacrene D
v)	6	Zingiberene
vi)	7	Beta-bisabolene
vii)	8	Alpha farnesene
viii)	9	Beta sesquiphellendrene
ix)	10	Alpha curcumeme

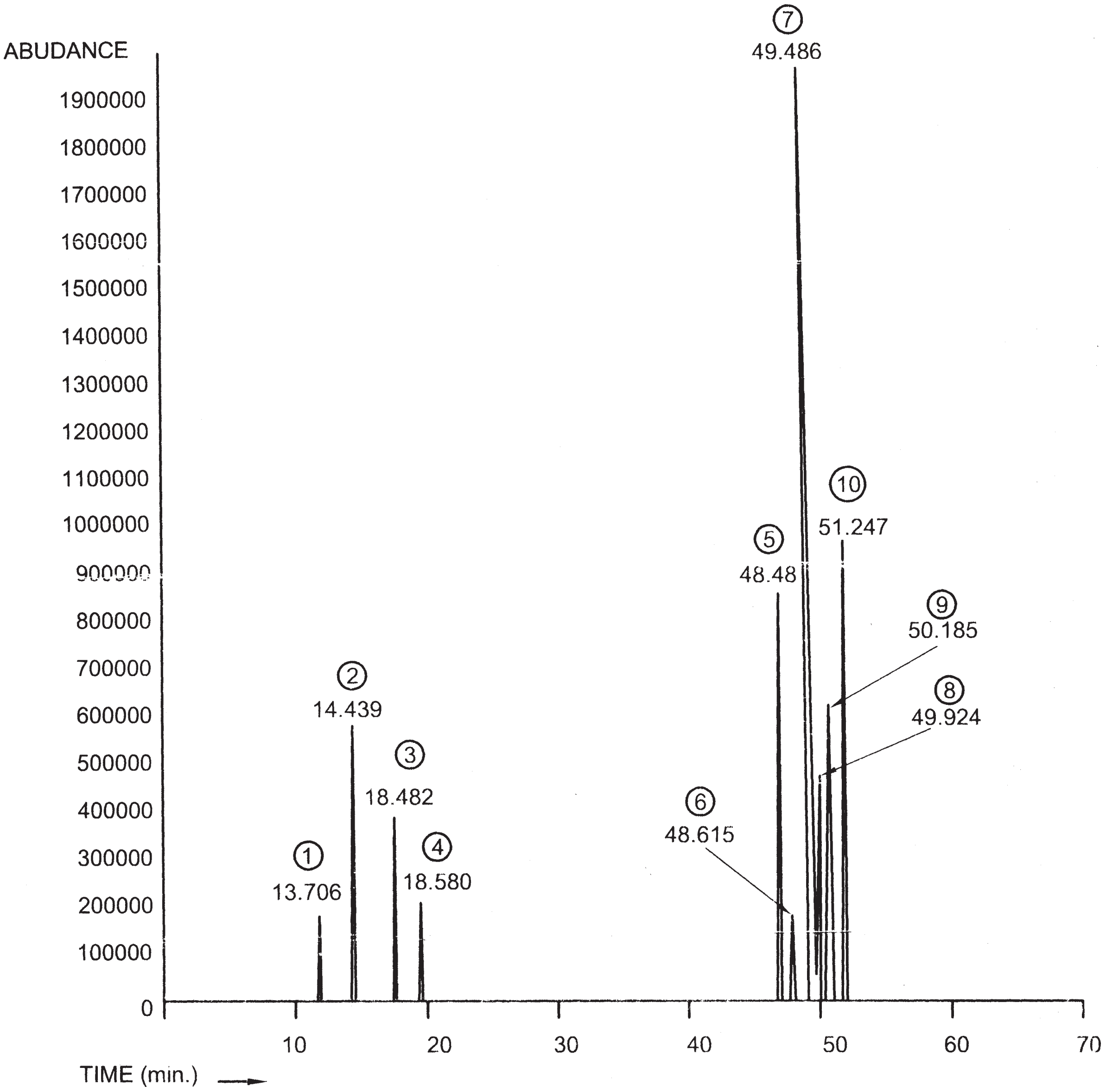

FIG. 2 OIL OF GINGER — GC PROFILE ON NON-POLAR COLUMN

Table 3 Non-Polar Chromatogram Peaks Identification

(*Fig*. 2 and *Clause* A-4)

Sl No. (1)	**Peak No.** (2)	**Identification** (3)
i)	1	Alpha pinene
ii)	2	Camphene
iii)	3	Phellandrene
iv)	4	1,8-cineole
v)	5	Alpha curcumeme
vi)	6	Germacrene D
vii)	7	Zingiberene
viii)	8	Alpha farnesene
ix)	9	Beta-bisabolene
x)	10	Beta sesquiphellendrene

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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